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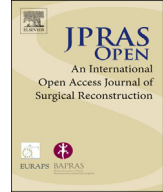
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## Case Report

## Isolated asymptomatic masseter muscle metastasis as first sign of metastatic disease in a patient with known melanoma

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## ABSTRACT

A 65-year-old woman diagnosed with a nodular melanoma on the right shoulder had a PET/CT scan 13 months later demonstrating a FDG-avid mass in the left masseter muscle, which was asymptomatic and not clinically evident. Pathologic analysis confirmed metastasis of melanoma. Further subcutaneous, intramuscular and bone metastases developed and the patient was treated with surgery and immunotherapy. The patient is in complete-remission with no evident metastases seen on PET/CT 2.5 years after treatment with adoptive cell therapy using tumor-infiltrating lymphocytes (TIL therapy). Asymptomatic skeletal muscle metastases identified with PET/CT can have therapeutic and prognostic implications and a PET/CT scan should be performed as a true whole-body scan.

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## Case report

A 65-year-old woman diagnosed in 2011 with a thick nodular melanoma on the right shoulder was treated with wide local excision and sentinel lymph node biopsy (negative). At a routine follow up visit

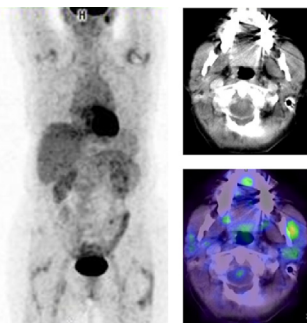
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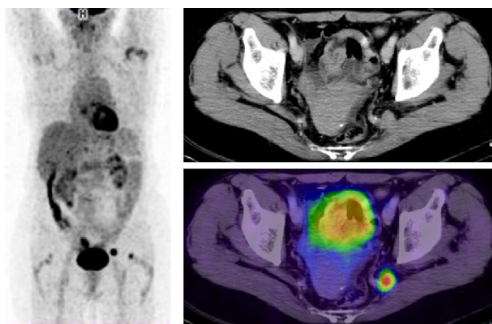
13 months after initial surgery the patient complained of generalized pain, but could not elaborate further. There were no abnormal findings on clinical examination. A limited whole-body scan (LWB) FDG PET/CT demonstrated a FDG-avid mass in the left masseter muscle ([Figure 1](#)). The corresponding CT showed no abnormal findings. The lesion was not palpable. The patient underwent surgery and histopathology confirmed metastasis.

The patient was without symptoms, but a routine LWB PET/CT five months later showed a soft tissue tumor in close proximity of the left sciatic nerve ([Figure 2](#)). Furthermore, the patient developed a swollen red right ankle and magnetic resonance imaging (MRI) scan hereof showed a lesion in the distal end of the fibula suspicious of metastasis. Biopsies confirmed metastatic lesions in both sites. An extended whole-body (TWB) PET/CT scan in February 2013 showed progression of disease with additional multiple subcutaneous metastases, and an osteolytic lesion in the sternum. Immunotherapy with interferon alfa-2b, pegylated (PEG-Intron) and interleukin (IL)-2 and later ipilimumab were given.

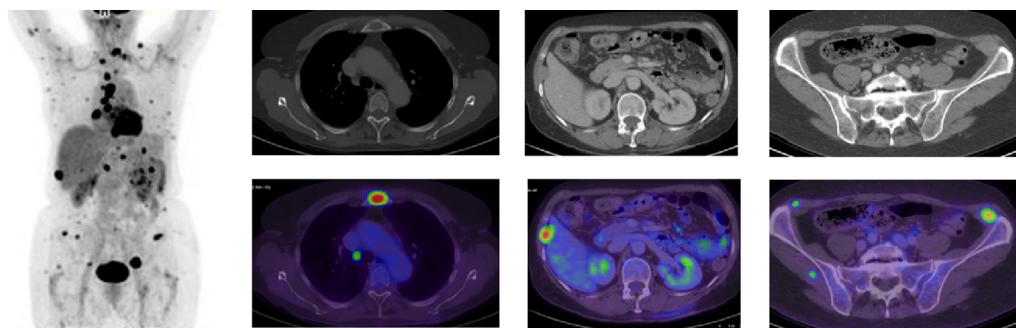
A PET/CT thirteen months after immunotherapy was started demonstrated progression with multiple new cutaneous metastases ([Figure 3](#)). Treatment with adoptive cell therapy using tumor-infiltrating lymphocytes (TIL therapy) was started.<sup>1</sup> This personalized immunotherapy is based on preconditioning chemotherapy followed by infusion of autologous tumor-infiltrating lymphocytes (TIL) and T cell growth factor interleukin-2 (IL-2).<sup>1,2</sup> The patient had a cutaneous metastasis excised from which TILs were isolated, cultured, expanded and concentrated for treatment. Following preconditioning lymphodepleting chemotherapy with cyclophosphamide and fludarabine a single treatment with infusion of TIL followed by IL-2 infusion was given. An evaluation PET/CT scan 4 months after TIL therapy showed regression of the disease.



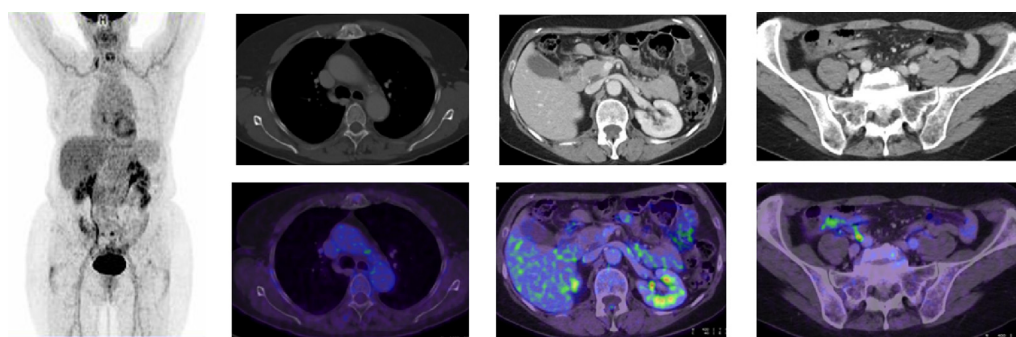
**Figure 1.** A limited whole-body scan (LWB) FDG PET/CT demonstrated a FDG-avid mass in the left masseter muscle. Histopathology confirmed metastatic melanoma lesion.



**Figure 2.** Routine LWB PET/CT five months after surgical treatment of an isolated asymptomatic masseter muscle metastasis showed a soft tissue tumor in close proximity of the left sciatic nerve.



**Figure 3.** PET/CT 13 months after immunotherapy was started demonstrated progression with multiple new cutaneous metastases.



**Figure 4.** PET/CT 24 months after adoptive cell therapy using tumor-infiltrating lymphocytes TIL therapy was started showed complete-remission.

The PET/CT 24 months after TIL therapy showed complete-remission (Figure 4). The patient remains well and is reviewed every six months with PET/CT with the latest PET/CT 2.5 years after TIL therapy still showing complete-remission.

## Discussion

Our case demonstrates isolated intramuscular metastases as the first sign of metastatic disease in a patient with known melanoma. In a study by Surov et al. skeletal muscle metastases in patients with metastatic cancer were diagnosed incidentally in the majority (76.3%) of patients during routine staging CT examinations.<sup>3</sup> Among patients with metastatic melanoma, skeletal muscle metastases were prevalent in 3.6%.<sup>3</sup> The increased use of PET/CT allows the detection of skeletal muscle metastases that would previously have remained undetected.<sup>4</sup> PET/CT is superior for the detection of distant metastases in both the staging and surveillance of melanoma patients.<sup>5</sup> Nguyen et al. showed that a significant percentage of soft tissue metastases (46%) occurred outside the limited whole-body field of view.<sup>6</sup> Similarly, the LWB PET/CT of our patient did not diagnose the bone metastasis in the distal end of the fibula. A true whole-body PET/CT does allow for a more accurate staging, restaging with therapeutic and prognostic implications for the patients.<sup>6,7</sup>

Until recently, the one-year survival rate for stage IV patients with M1c disease was 33%.<sup>8</sup> However, a new era of systemic therapy has led to significant improvements in overall survival suggesting that some patients may be cured.<sup>9</sup> Evidence exists that current therapeutic options for metastatic disease are more effective if the disease is treated with a lower disease burden.<sup>10,11</sup> Hence, melanoma metastases must be diagnosed early in order to maximize the chances of patient survival.

## Conflicts of interest

No conflicts of interest.

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